CLAIMS

1. A method for removing from a patient's blood a specific plasma fraction containing substances within a specific molecular weight range, the method comprising the steps of:

(a) attaching to the blood stream of the patient a blood perfusion means for extracorporeal blood circulation, the blood perfusion means comprising a selective filtration means;

(b) removing blood from the blood stream of the patient, and conveying the blood extracorporeally to the selective filtration means;

(c) filtering the blood with the selective filtration means, the selective filtration means being adapted for removing the specific plasma fraction from the blood, at a first rate of about 1 to about 20 mL/min for a period of about 1 to about 24 hours;

(d) returning the filtered blood to the patient, minus the specific plasma fraction; and

(e) simultaneously infusing the patient with a plasma substitute at a second rate about equal to the first rate.

2. The method of claim 1, wherein the specific molecular weight range is about 1 Da to about 200 kDa.

3. The method of claim 2, wherein the specific molecular weight range is about 1 Da to about 150 kDa.

4. The method of claim 3, wherein the specific molecular weight range is about 1 Da to about 100 kDa.

5. The method of claim 4, wherein the specific molecular weight range is about 1 Da to about 80 kDa.

6. The method of claim 5, wherein the specific molecular weight range is about 1 Da to about 60 kDa.

7. The method of claim 1, wherein the first rate is about 1 to about 10 mL/min.

8. The method of claim 1, wherein the period is about 1 to about 6 hours.

9. The method of claim 1, wherein the plasma substitute is selected from the group consisting of

(a) normal whole plasma from human donors;

(b) a plasma product prepared from normal whole human plasma;

(c) a synthetic product mimicking the serum fraction; and

(d) a combination of any of (a), (b), or (c).

10. A plasma purification apparatus, comprising:

a blood perfusion means for extracorporeally circulating a patient's blood, said blood perfusion means further comprising

(i) a first catheter means adapted to attach the blood perfusion means to the patient's blood stream and for providing egress for the patient's blood from the blood stream; and

(ii) a second catheter means adapted to attach the blood perfusion means to the blood stream and for returning the patient's filtered blood to the blood stream;

(iii) a first tubing means for conveying the patient's blood flowing from the first catheter means;

(iv) a first pump for propelling the patient's blood through the first tubing means at a first preselected steady flow rate, the first pump being positioned at a location on the first tubing means;

(v) a second tubing means for conveying the patient' filtered blood to the second catheter means;

(vi) at least one plasma filtration cartridge for filtering the patient's blood, the plasma filtration cartridge enclosed by a housing, and having within the housing,

an inner compartment and an outer compartment; the inner compartment and the outer compartment being separated by a semipermeable membrane having a retention coefficient of about 0.50 to about 1.00 for blood plasma constituents with molecular weights greater than a molecular weight of interest, for removing a specific plasma fraction, said plasma filtration cartridge being adapted for filtering at a rate of about 1 to about 20 mL/min for a period of about 1 to about 24 hours, said plasma filtration cartridge comprising:

(a) an inlet port in the housing for receiving blood flowing from the first tubing means and conveying the blood into the inner compartment;

(b) a first outlet port in the housing for conveying filtered blood from the inner compartment to the second tubing means; and

(c) a second outlet port in the housing for conveying a plasma filtrate from the outer compartment

(vii) a third tubing means ; and

(viii) a second pump for regulating the transmembranous pressure across the semipermeable membrane, the second pump being adapted for pumping at a second preselected steady flow rate and being positioned at a location along the third tubing means.

11. The apparatus of Claim 10, wherein the first catheter means and the second catheter means are combined in a double-lumen catheter.

12. The apparatus of Claim 10, further comprising an enclosed plasma sorption means joined to the second outlet port by the third tubing means, the plasma sorption means adapted for receiving the plasma filtrate conveyed by the third tubing means, for adsorbing a toxic substance in the plasma filtrate, and for releasing adsorbed plasma filtrate to a receptacle.

13. The apparatus of claim 10, wherein the molecular weight of interest is about 200 kDa, or less.

14. The apparatus of claim 13, wherein the molecular weight of interest is about 150 kDa, or less.

15. The apparatus of claim 14, wherein the molecular weight of interest is about 100 kDa, or less.

16. The apparatus of claim 15, wherein the molecular weight of interest is about 80 kDa, or less.

17. The apparatus of claim 16, wherein the molecular weight of interest is about 60 kDa, or less.